

## CLAIMS

We claim:

1. A simulation system comprising:

- an event handler that is configured to determine occurrences of events,
- a node simulator that is configured to simulate each event to determine one or more characteristics associated with the occurrence of the event,
- a cache that is configured to store the one or more characteristics associated with the occurrence of select events,
- and
- a cache controller that is configured to determine whether:
  - to invoke the node simulator to determine the one or more characteristics associated with a subsequent event or
  - to retrieve the one or more characteristics associated with the subsequent event from the cache.

2. The simulation system of claim 1, wherein

- the select events correspond to communications from a transmitter to a receiver in a wireless network.

3. The simulation system of claim 2, wherein:

- the cache controller is further configured to:
  - determine a transmitter cluster associated with the transmitter,
  - determine a receiver cluster associated with the receiver; and
- the cache is configured to store the one or more characteristics based on the transmitter cluster and the receiver cluster.

4. The simulation system of claim 3, wherein

- the cache controller determines the transmitter cluster and the receiver cluster based upon factors associated with the event.

5. The simulation system of claim 3, wherein

the receiver cluster is determined based upon a location of the receiver relative to a location of the transmitter.

6. The simulation system of claim 3, wherein

the transmitter cluster is determined based upon an output power of the transmitter.

7. The simulation system of claim 1, wherein:

each event includes factors that influence the determination of the one or more characteristics, and

the cache is configured to store the one or more characteristics based on the factors.

8. The simulation system of claim 1, wherein:

each event includes factors that influence the determination of the one or more characteristics,

the cache controller is further configured to determine a category associated with the event based on the factors, and

the cache is configured to store the one or more characteristics based on the category.

9. The simulation system of claim 8, wherein

the cache controller determines the category based on a quantization of one or more of the factors.

10. The simulation system of claim 8, wherein

the cache controller determines the category based on a defined range of one or more of the factors.

11. A simulation method comprising:

determining an event to be simulated; and

if a similar event has been simulated previously:

retrieving characteristics associated with the similar event from a cache;

otherwise:

simulating the event to determine characteristics associated with the event, and

storing the characteristics associated with the event in the cache.

12. The simulation method of claim 11, wherein

determining whether the similar event has been previously simulated includes:

categorizing the event, and

determining whether a similarly categorized event has been previously simulated.

13. The simulation method of claim 12, wherein

categorizing the event includes quantizing one or more factors underlying the event.

14. The simulation method of claim 12, wherein

categorizing the event includes clustering components of the event.

15. The simulation method of claim 11, wherein
- the event corresponds to a communication from a transmitter to a receiver; and
  - determining whether the similar event has previously been simulated includes:
    - determining a transmitter cluster corresponding to the transmitter, and
    - determining a receiver cluster corresponding to the receiver; and
  - determining whether the characteristics are stored in the cache corresponding to a communication from the transmitter cluster and the receiver cluster.
16. The simulation method of claim 15, wherein
- determining the transmitter cluster and the receiver cluster is based on one or more factors underlying the event.
17. The simulation method of claim 15, wherein
- determining the transmitter cluster and the receiver cluster is based on one or more defined ranges of one or more factors underlying the event.
18. The simulation method of claim 15, wherein
- determining the transmitter cluster is based on an output power of the transmitter.
19. The simulation method of claim 15, wherein
- determining the receiver cluster is based on a location of the receiver relative to a location of the transmitter.

20. A computer program for execution on a computer system that causes the communication system to:

- maintain a schedule of events to be simulated;

- select an event from the schedule of events based on a simulated time;

- determine whether the event is cache-related; and,

- if the event is not cache-related:

  - simulate the event to determine characteristics related to the event; otherwise,

- if the event is cache-related:

  - determine whether a similar event has previously been simulated; and

  - if the similar event has previously been simulated:

    - retrieve characteristics related to the similar event from a cache;

  - otherwise

    - simulate the event to determine characteristics related to the event, and

    - store the characteristics related to the event in the cache; and

- schedule subsequent events based on the characteristics.

21. The computer program of claim 20, wherein the computer is further configured to

- determine whether the similar event has been previously simulated by:

  - categorizing the event, and

  - determining whether a similarly categorized event has been previously simulated.

22. The computer program of claim 21, wherein the computer is further configured to

- categorize the event by quantizing one or more factors underlying the event.

23. The computer program of claim 21, wherein the computer is further configured to

- categorize the event by clustering components of the event.

24. The computer program of claim 20, wherein:
- the event corresponds to a communication from a transmitter to a receiver; and
  - the computer is further configured to:
    - determine whether the similar event has previously been simulated by:
      - determining a transmitter cluster corresponding to the transmitter, and
      - determining a receiver cluster corresponding to the receiver; and
    - determine whether the characteristics are stored in the cache corresponding to a communication from the transmitter cluster and the receiver cluster.
25. The computer program of claim 24, wherein the computer is further configured to
- determine the transmitter cluster and the receiver cluster based on one or more factors underlying the event.
26. The computer program of claim 24, wherein the computer is further configured to
- determine the transmitter cluster based on an output power of the transmitter.
27. The computer program of claim 24, wherein the computer is further configured to
- determine the receiver cluster based on a location of the receiver relative to a location of the transmitter.